I CLAIM:

1. 1.   An ocular scleral prosthesis comprising

2   an elongated body adapted to be implanted in an elongated

3   pocket surgically formed within scleral tissue of an eye, said

4   pocket being formed in the zone of the globe of said eye

5   exterior to the ciliary body and extending generally

6   circumferentially of said zone for a predetermined length,

7   said pocket having a base comprised of inner layers of said

8   scleral tissue, a flap formed from outer layers of said scleral

9   tissue, an anterior margin and a posterior margin,

10   said elongated body having a first surface and a second

11   surface opposite said major surface, said first surface and said

12   second surface being adapted to contact said base and said flap

13   of said scleral pocket,

14   said first surface and said second surface being separated

15   by a distance sufficient to elevate said flap and exert

16   outwardly directed traction on at least said anterior margin of

17   said pocket.

1 2.   The scleral prosthesis of Claim 1 wherein said elongated

2 body has a length that is greater than said predetermined length

3 of said pocket.

1 3.   The scleral prosthesis of Claim 1 wherein said prosthesis

2 has a length of from about 3.0 millimeters to about

3 8.0 millimeters.

1 4.   The scleral prosthesis of Claim 1 wherein said prosthesis

2 has a length of from about 3.5 millimeters to about

3 6.0 millimeters.

1 5.   The scleral prosthesis of Claim 1 wherein said prosthesis

2 has a length of from about 4.0 millimeters to about

3 5.0 millimeters.

1 6.   The scleral prosthesis of Claim 12 wherein said prosthesis

2 has a length of about 4.5 millimeters.

1 7.   The scleral prosthesis of Claim 1 wherein said first

2 surface is a major surface adapted to contact a major

3 fraction of said base or said flap of said scleral pocket.

1 8.   The scleral prosthesis of Claim 7 wherein said

2 elongated body has a length that is greater than said

3 length of said pocket.

1 9.   The scleral prosthesis of Claim 7 wherein said major

2 surface has a concave curvature.

1 10.   The prosthesis of Claim 9 wherein said curvature is

2 generally adapted to natural curvature of said scleral

3 tissue in which said scleral pocket is formed.

1 11.   The prosthesis of Claim 9 wherein said concave surface

2 has a radius of curvature of from about 7 millimeters to

3 about 11 millimeters.

1   12.   The prosthesis of Claim 9 wherein said concave surface

2   has a radius of curvature of from about 8 millimeters to

3   about 10 millimeters.

1   13.   The prosthesis of Claim 9 wherein said concave surface

2   has a radius of curvature of about 9 millimeters.

1   14.   The scleral prosthesis of Claim 7 wherein said second

2   surface has an antero-posterior dimension about the same as

3   said major surface.

1   15.   The scleral prosthesis of Claim 7 wherein said major

2   surface and said second surface are spaced apart a distance

3   of from about 0.3 millimeters to about 0.9 millimeters.

1   16.   The scleral prosthesis of Claim 15 wherein said major

2   surface and said second surface are spaced apart a distance

3   of from about 0.5 millimeters to about 0.7 millimeters.

1   17.   The scleral prosthesis of Claim 15 wherein said major

2   surface and said second surface are spaced apart a distance

3   of about 0.6 millimeters.

1   18.   The scleral prosthesis of Claim 7 wherein said

2   prosthesis has a length of from about 3.0 millimeters to

3   about 8.0 millimeters.

1   19.   The scleral prosthesis of Claim 18 wherein said

2   prosthesis has a length of from about 3.5 millimeters to

3   about 6.0 millimeters.

1   20.   The scleral prosthesis of Claim 18 wherein said

2   prosthesis has a length of from about 4.0 millimeters to

3   about 5.0 millimeters.

1   21.   The scleral prosthesis of Claim 18 wherein said

2   prosthesis has a length of about 4.5 millimeters.

1 22. The scleral prosthesis of Claim 7 wherein said

2 prosthesis has an antero-posterior dimension of from about

3 0.3 millimeters to about 0.9 millimeters.

1 23. The scleral prosthesis of Claim 22 wherein said

2 prosthesis has an antero-posterior dimension of from about

3 0.5 millimeters to about 0.7 millimeters.

1 24. The scleral prosthesis of Claim 22 wherein said

2 prosthesis has an antero-posterior dimension of about

3 0.6 millimeters.

1 25. An ocular scleral prosthesis according to Claim 1

2 comprising

3   a base member having an elongated planform with a

4 major dimension, a minor dimension, an inner major surface

5 and an outer major surface, said outer major surface being

6 generally smooth and adapted to contact ocular tissue

7 within a pocket surgically formed within scleral tissue of

8 an eye, and

9   a ridge member on said inner major surface of said

10   base member, extending along at least a substantial

11   fraction of said major dimension of said base.

1   26.   The prosthesis of Claim 25 wherein said anterior rim

2   is anteriorly concave and said posterior rim is posteriorly

3   convex.

1   27.   The prosthesis of Claim 25 wherein said outer major

2   surface of said base is planar.

1   28.   The prosthesis of Claim 25 wherein said outer major

2   surface of said base is outwardly convex along said major

3   dimension.

1   29.   The prosthesis of Claim 25 wherein said planform is

2   generally rectangular.

1   30.   The prosthesis of Claim 25 wherein said planform has

2   semicircular ends.

1   31.   The prosthesis of Claim 25 wherein said planform is

2   elliptical.

1   32.   The prosthesis of Claim 25 wherein said ridge extends

2   along substantially the entire major dimension of said

3   base.

1   33.   The prosthesis of Claim 25 wherein said ridge extends

2   along a portion of said major dimension of said base

3   member.

1   34.   The prosthesis of Claim 25 wherein said ridge has a

2   maximum height above said base located intermediate between

3   said anterior edge and said posterior edge.

1   35.   The prosthesis of Claim 34 wherein said maximum height

2   of said ridge is located less than halfway from said

3   anterior edge to said posterior edge.

1   36.   The prosthesis of Claim 34 wherein said maximum height

2   of said ridge is located about 12 % of the distance from

3   said anterior edge to said posterior edge.

1   37.   The prosthesis of Claim 25 wherein said maximum height

2   of said ridge is located at said anterior edge.

1   38.   The prosthesis of Claim 25 wherein said major

2   dimension is about 5 millimeters.

1   39.   The prosthesis of Claim 25 wherein said minor

2   dimension is about 2 millimeters.

1   40.   The prosthesis of Claim 1 wherein said prosthesis is made

2   of a physiologically acceptable metal.

1   41.   The prosthesis of Claim 40 wherein said prosthesis is made

2   of metal selected from the group consisting of titanium,

3   platinum, gold, tantalum, stainless steel, and physiologically

4   acceptable alloys.

1   42.   The prosthesis of Claim 1 wherein said prosthesis is made

2   of a ceramic material.

1   43.   The prosthesis of Claim 42 wherein said ceramic is selected

2   from the group consisting of porcelain, alumina, silica, silicon

3   carbide, and high-strength glasses.

1   44.   The prosthesis of Claim 1 wherein said prosthesis is made

2   of a synthetic resin.

1   45.   The prosthesis of Claim 44 wherein said synthetic resin is

2   selected from the group consisting of poly(methyl methacrylate),

3   polyethylene, polypropylene, poly(tetrafluoroethylene),

4   polycarbonate, and silicone resins.

1   46.   The prosthesis of Claim 1 wherein said prosthesis is made

2   of a reinforced composite material.

1   47.   The prosthesis of Claim 46 wherein said reinforced

2   composite material is a glass-fiber-reinforced synthetic resin.

1   48.   The prosthesis of Claim 46 wherein said reinforced

2   composite material is a carbon-fiber-reinforced material.

1   49.   The prosthesis of Claim 46 wherein said reinforced

2   composite material is carbon-fiber-reinforced carbon.

1   50.   The prosthesis of Claim 1 wherein said prosthesis is made

2   of flexible material and is provided with an internal cavity

3   filled with a fluid or a gel.

1   51.   The prosthesis of Claim 50 wherein said fluid is water or a

- 42 -

2   physiological saline solution.

1   52.   The prosthesis of Claim 44 wherein said gel is a silicone

2   material, or collagen, or gelatin.

1   53.   The prosthesis of Claim 44 wherein said fluid is a

2   physiologically acceptable oil.

1   54.   The prosthesis of Claim 44 wherein said fluid is a silicone

2   oil.

1   55.   The prosthesis of Claim 1 wherein said prosthesis is

2   provided with at least one hole for the passage of a suture.

1   56.   A method for increasing the amplitude of accommodation of

2   an eye comprising

3   forming a plurality of elongated pockets, each having a

4   lengthwise dimension, in a sclera of said eye, said lengthwise

5   dimension being oriented generally transversely to a meridian of

6   said eye,

7   said eye having a sclera forming a generally globular

8   outer layer of said eye, a transparent cornea forming

- 43 -

9   an anterior surface of said eye, a limbus formed by

10   the junction of said cornea with said sclera, a

11   generally circular ciliary body located inwardly of

12   said sclera posterior to said limbus, and a

13   crystalline lens located centrally within said ciliary

14   body and having an equator, said equator of said lens

15   defining a plane intersecting said sclera in a

16   generally circular intersection posterior to said

17   limbus,

18 said pockets having an anterior margin and a posterior margin,

19 said anterior margin being located a distance of from about

20 0.5 millimeters to about 4.5 millimeters posterior to said

21 limbus; and

22   positioning in each of said pockets a prosthesis according

23 to Claim 1.

1   57.   A method for treating presbyopia comprising

2   forming a plurality of elongated pockets, each having a

3   lengthwise dimension, in a sclera of said eye, said lengthwise

4   dimension being oriented generally transversely to a meridian of

5   said eye,

6   said eye having a sclera forming a generally globular

7   outer layer of said eye, a transparent cornea forming

8   an anterior surface of said eye, a limbus formed by

9   the junction of said cornea with said sclera, a

10   generally circular ciliary body located inwardly of

11   said sclera posterior to said limbus, and a

12   crystalline lens located centrally within said ciliary

13   body and having an equator, said equator of said lens

14   defining a plane intersecting said sclera in a

15   generally circular intersection posterior to said

16   limbus,

17   said pockets having an anterior margin and a posterior margin,

18   said anterior margin being located a distance of from about

19   0.5 millimeters to about 4.5 millimeters posterior to said

20   limbus; and

21   positioning in each of said pockets a prosthesis according

22   to Claim 1.

- 45 -

1 58. A method for treating hyperopia comprising

2   forming a plurality of elongated pockets, each having a

3 lengthwise dimension, in a sclera of said eye, said lengthwise

4 dimension being oriented generally transversely to a meridian of

5 said eye,

6   said eye having a sclera forming a generally globular

7   outer layer of said eye, a transparent cornea forming

8   an anterior surface of said eye, a limbus formed by

9   the junction of said cornea with said sclera, a

10   generally circular ciliary body located inwardly of

11   said sclera posterior to said limbus, and a

12   crystalline lens located centrally within said ciliary

13   body and having an equator, said equator of said lens

14   defining a plane intersecting said sclera in a

15   generally circular intersection posterior to said

16   limbus,

17 said pockets having an anterior margin and a posterior margin,

18 said anterior margin being located a distance of from about

19 0.5 millimeters to about 4.5 millimeters posterior to said

20 limbus; and

21   positioning in each of said pockets a prosthesis according

22 to Claim 1.

- 46 -

1   59. A method for treating primary open angle glaucoma

2   comprising

3   forming a plurality of elongated pockets, each having a

4   lengthwise dimension, in a sclera of said eye, said lengthwise

5   dimension being oriented generally transversely to a meridian of

6   said eye,

7   said eye having a sclera forming a generally globular

8   outer layer of said eye, a transparent cornea forming

9   an anterior surface of said eye, a limbus formed by

10   the junction of said cornea with said sclera, a

11   generally circular ciliary body located inwardly of

12   said sclera posterior to said limbus, and a

13   crystalline lens located centrally within said ciliary

14   body and having an equator, said equator of said lens

15   defining a plane intersecting said sclera in a

16   generally circular intersection posterior to said

17   limbus,

18   said pockets having an anterior margin and a posterior margin,

19   said anterior margin being located a distance of from about

20   0.5 millimeters to about 4.5 millimeters posterior to said

21   limbus; and

22   positioning in each of said pockets a prosthesis according

23   to Claim 1.

1   60.   A method for treating ocular hypertension comprising

2   forming a plurality of elongated pockets, each having a

3   lengthwise dimension, in a sclera of said eye, said lengthwise

4   dimension being oriented generally transversely to a meridian of

5   said eye,

6   said eye having a sclera forming a generally globular

7   outer layer of said eye, a transparent cornea forming

8   an anterior surface of said eye, a limbus formed by

9   the junction of said cornea with said sclera, a

10   generally circular ciliary body located inwardly of

11   said sclera posterior to said limbus, and a

12   crystalline lens located centrally within said ciliary

13   body and having an equator, said equator of said lens

14   defining a plane intersecting said sclera in a

15   generally circular intersection posterior to said

16   limbus,

17   said pockets having an anterior margin and a posterior margin,

18   said anterior margin being located a distance of from about

- 48 -

19   0.5 millimeters to about 4.5 millimeters posterior to said

20   limbus; and

21   positioning in each of said pockets a prosthesis according

22   to Claim 1, with said anterior edge of said prosthesis oriented

23   toward the anterior portion of said eye and said inner major

24   surface with said ridge oriented inwardly.